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Abstract
This research included two parts. The first part was to prepare and characterize neat epoxy with various stoichiometric ratio of diglycidyl ether of bisphenol A (DGEBA) and 4,4-diamino-diphenyl – sulfone (DDS) by solution blending, and second part was to prepare and characterize epoxy/γ-Al2O3 nanocomposite. According to first part, the results illustrated that the thermal property and curing level of neat epoxy were optimal when the stoichiometric ratio of DGEBA and DDS was kept at 1:1 for the epoxy/γ-Al2O3 nanocomposite. In the second part, the DGEBA, DDS, and Carboxyl-terminated butadiene acrylonitrile(CTBN) were homogeneously mixed with the 2-butanone(MEK) containing various amount ofγ-Al2O3 nanocomposites. The epoxyγ-Al2O3 nanocomposite were prepared by a step thermal curing process. It showed that the value of glass transition temperature(Tg), thermal degradation temperatures(Td5% and Td10%), storage modulus, coefficient thermal conductivity, and mechanical property of the epoxy/5phrγ-Al2O3 nanocomposite were the highest as compared with those of neat epoxy and other composites. Scanning electron microscopy (FE-SEM) and transmission electron microscopy (TEM) analyses showed that γ-Al2O3 nanoparticles were well dispersed in epoxy/1~5phrγ-Al2O3 nanocomposite, but some γ-Al2O3 nanoparticles were aggregated in the epoxy/7~9phrγ-Al2O3 nanocomposite.
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